

MODULAR AUDIO ON THE MOON



MMXIII

WELCOME

WELCOME TO THE LUNAR EXPERIENCE



The "LUNAR EXPERIENCE" group of musicians & engineers is developing modules for analog modular synthesizers following the 5U standard.

Main objective is being ease of use, especially in live performance situations, on stage and in the studio.

In the last five years our continuously growing line of products – partly based on our customers' suggestions – does include modules that do allow to explore new ways to generate trigger signals and control voltages, to process control voltages, to introduce voltage control in a creative manner and to integrate modern midi- and even computer-generated instruments and effects.

Besides our range of individual modules we design custom made components to be integrated into bigger systems making them performance-ready. For example Hans Zimmer's "Giorgio" synthesizer (see page 12).

Each module is hand crafted in Germany, utilizing only high quality components, known from the classic instruments in history. This gives the look and feel of the great original modular synthesizers.

501D

DUAL VOLTAGE CONTROLLED OSCILLATOR



This module combines two **VOLTAGE CONTROLLED OSCILLATOR** circuits in one double-width unit.

The two oscillator halves enter a symbiosis in that they share some controls which affect both while other functions are individual to each oscillator.

Each oscillator has its own octave range switch (32'...2' plus low frequency and wide settings, 'wide' augmenting the range of the tune pots to the whole 10-octave span of the oscillators).

The master tune control on the left side affects both vcOs while the corresponding pot on the right controls the detune interval between vco 1 and 2. Bipolar attenuators for frequency and pulse width modulation with their corresponding input jacks are separate as are the two pulse width controls.

The central waveform selector controls both wave outputs 1 and 2 while three additional output jacks provide sine, sawtooth and pulse waves of oscillator 2; the output area is completed by a white noise source. More individual wave outputs can be obtained by adding the 501E expander module.

The seven control voltage inputs allow control of frequency modulation and pulse width modulation of vco 1 and 2. Two more jacks control frequency (1V/oct) while the central cv input jack controls both oscillators at once.

501E

DUAL OSCILLATOR EXPANDER



The **OSCILLATOR EXPANDER** adds more inputs and outputs to the 501D dual oscillator.

Ten output jacks provide the individual waveform outputs of oscillator 1 and 2: sine, sawtooth, triangle, rectangular and pulse.

The four inputs expand both vcOs by linear frequency modulation and hard sync.

4 501M

OSCILLATOR MIXER



The **OSCILLATOR MIXER**

blends the combined outputs of oscillator 1 and 2, plus three individual outputs of oscillator 1 (sine, sawtooth, pulse) and white noise. The attenuators allow to invert the source signals, too.

Each channel has its own mute switch with a LED. The three out jacks provide a mixed output of both oscillator sources plus two individual outputs for vco 1 and 2 overriding the six mute switches (always 'on').

506

VOLTAGE CONTROLLED MODIFIER



The **MODIFIER MODULE** is a combination of voltage controlled low pass filter and voltage controlled amplifier connected in series.

The vcf is a ladder type lowpass filter featuring switchable slopes (12/18/24 dB/oct) and voltage controllable regeneration.

In addition to the manual frequency and resonance dials there are three attenuated control voltage inputs for filter cutoff frequency (bipolar), resonance and amplifier gain.

The vca bypass switch opens the amplifier to ease control while working on a filter patch.

511C

VOLTAGE CONTROLLED ENVELOPE GENERATOR



VOLTAGE CONTROLLED ENVELOPE

GENERATOR in typical ADSR-Style with five voltage controlled parameters. Control voltage inputs with associated attenuator knobs for attack time, decay time, sustain level, release time and envelope amplitude.

The input jack for the amount of contour control is internally connected to +10 volt if nothing is patched. The time parameters range from 1 ms to approx. 20 s (at full modulation).

A gate button allows for manual triggering the envelope. Trigger threshold of the gate input is ca. 1 volt, positive edge.

The time control voltage inputs are "chained": i. e. a control voltage in the "attack"-input controls the inputs D, and R as well, if there is nothing else patched. Control range is 0-10 volts, higher control voltages give longer envelope times.

Two LEDs serve as indicator lamps for 'gate pulse present' and for the envelope output. Two envelope outputs serve as normal (0 to 10 volts) and inverted (0 to -10 volts) outputs.

511AC

QUAD VOLTAGE CONTROLLED GATE DELAY



The **QUAD GATE DELAY** combines four voltage controlled gate delay circuits in one module, which delay the incoming gate signals in a range from ca. 1 ms up to 20 seconds. Each delay unit has its own pair of display LEDs.

The four gate in/outputs are internally connected like this: Output 1 goes into input 2, output 2 goes into input 3 and output 3 goes into input 4. This allows complex delay combinations without external patching. The 'Manual Gate' button affects delay input 1.

The time control voltage inputs are "chained": i. e. a control voltage in the input 1 jack controls the inputs 2/3/4 as well, if there is nothing else patched. (Input 1 is internally connected to +10 volts if nothing is patched).

Control range 0-10 volts, higher control voltages give longer delay times.

551

MIDI TO VOLTAGE CONVERTER



MIDI TO CONTROL VOLTAGE converts MIDI data into analog control voltages.

A MIDI note-on command gets converted into a keyboard control voltage and gate signal, the third output turns the note-on velocity into a corresponding control voltage.

Three more output jacks on the left generate voltages from pitch- and modulation wheel controllers. The jack labeled "Controller" puts out a voltage from one of 9 selectable MIDI controller sources, e. g. after touch · breath controller pedal · sustain pedal · panorama · master volume.

The three toggle switches enable
(a) pitch bending to be added to keyboard cv
(b) change of note priority (highest, lowest, last note)
(c) legato mode.

The MIDI channel is selectable from 1-16.

552

QUAD VOLTAGE TO MIDI CONVERTER



VOLTAGE CONTROL VOLTAGE TO MIDI CONVERTER module enables the user to integrate modern midi- and even computer-generated instruments and effects into his modular environment.

Control your midi-equipment from your analog sequencer or from other control voltage generating devices. This module features four input pairs for control voltages (0 -10 volts) and gate signals to be transformed into midi-compatible control data. Each input pair can be independently transformed into one the following types of midi data:

- Note-on/note-off
- Volume (CC7)
- Velocity (w/note-on)
- Panorama (CC10)
- Pitch bend
- Special (CC20)
- Modulation wheel (CC1)
- Channel after touch
- Breath controller (CC2)
- Sustain Pedal
- Pedal (CC4)
- Program Change

Note output can be transposed via midi information or control voltage (1 V/oct). Transpose status can be enabled independently for each of the four inputs. Eight midi channel configurations are provided to ease the setup.

553

MIDI TO CLOCK CONVERTER



MIDI TO CLOCK converts a MIDI clock into analog clock and gate-signals, to synchronize e. g. analog step-sequencers to MIDI-hardware- or software-sequencers.

The M553 derives clock signals from the native MIDI clock resolution of 1/96 notes up to 1/4 notes.

The right clock-output supplies a fixed clock signal of 1/16 notes. The start/stop jacks supply relevant trigger-signals from MIDI start/stop commands while the two „note-on...” jacks supply gate signals, derived from MIDI note-on commands.

The MIDI channel is selectable 1–16.

554

OCTAL CLOCK DIVIDER



OCTAL CLOCK DIVIDER combines 8 divider circuits in one module. Each of the dividers offers twelve division factors:

1 · 2 · 3 · 4 · 5 · 6 · 7 · 8 · 10 · 12
16 and 32.

The input jacks are normalized to allow complex divider combinations without external patching:

Input 1 is daisy chained to input 3, input 3 to 5, input 5 to 7. Output 1 is daisy chained to input 2, output 3 to input 4, output 5 to input 6, output 7 to input 8.

Input 8 can be configured (jumper on the main circuit board) to serve as master reset input for dividers 1 to 7.

563 V2

TRIGGER SEQUENCER



563 E

TRIGGER SEQUENCER EXPANDER



EIGHT STEP/FOUR ROW TRIGGER SEQUENCER with built-in clock-oscillator. The 32 switches (with associated LEDs) have three positions each: gate-on, gate-off and reset.

Switch-on time (adjustable width of the gate pulse) is independently variable for each of the four busses. Two buttons to shift and reset the trigger position manually (all four rows); two buttons with associated trigger inputs to start and stop the internal oscillator. One input to reset the sequencer to position 1 via trigger pulse. Four independent trigger inputs, one for each bus.

The jacks are „switched“, so that, if e. g. only input 1 is used, inputs 2/3/4 are affected as well. If none of the sockets is used, the built-in clock oscillator is active. Four trigger/gate-outputs for the four rows of switches.

The module is four units wide.

TRIGGER SEQUENCER EXPANDER MODULE for the M563 V2 Trigger Sequencer. Each of the 32 step positions of the connected M563 V2 has now his own dedicated output jack. Note: M563 V1 sequencers can be upgraded to V2.

564

SEQUENTIAL DIVIDER SWITCH



SEQUENTIAL DIVIDER SWITCH, a combination of a sequential 4-to-1/1-to-4 bidirectional electronic switch with clock divider. Each switch has its own set-button for manual activation, trigger input (positive edge) and classic style indicator lamps. One output/input-jack, four output/input jacks, clock input to shift the switch position. Four counter circuits, doubling as clock dividers, are connected in series with adjustable divider ratios.

Ratio switch positions

- SKIP skip step

- 1 shift after 1 clock pulse
- 2 shift after 2 clock pulses
- 3 shift after 3 clock pulses
- 4 shift after 4 clock pulses
- 8 shift after 8 clock pulses

Each switch has its own gate output: 'on' as long as step is active).

565V3

QUAD QUANTIZER



QUAD QUANTIZER featuring four independent quantizer circuits forces variable control voltages into semitone intervals (1/12 volt) over a bipolar input voltage range of more than twenty octaves (255 semitones). Gate pulses fed into the "Gate In"-jack trigger the quantizer. An "open" gate input quantizes, i. e. if no gate jacks are patched. The four gate-ins are passed through, one plugged IN 1 feeds IN 2 to IN 4 as well. The gate outputs supply a pulse, whenever the (quantized) output voltage changes. The most recent quantized value remains preserved until the next quantization will occur. An M 565 v1 or v2 module can be updated to a v3 module to allow to connect M 565 D controllers.

QUANTIZER CONTROLLER allows to limit the output voltages generated by the M 565 v3 Quad Quantizer to any desired key, chord or note interval. Using the array of 12 keyboard-like arranged LED buttons, notes can be activated or deactivated in any combination.

Up to two M 565 D Quantizer Controller modules can be connected to a single M 565 v3. If only one M 565 D is connected, all 4 channels are forced to its settings.

If two M 565 D are connected channels 1 and 2 are controlled by the first and channels 3 and 4 by the second. Multiple quantization settings can be stored if a M 567 Universal Programmer is connected to the M 565 v3.

565D

QUANTIZER CONTROLLER



568

QUAD SEQUENTIAL TRIGGER SOURCE

QUAD SEQUENTIAL TRIGGER SOURCE is a trigger sequencer featuring four tracks of trigger positions, each with 32 steps, which can be combined to one long sequence of up to 128 steps:

4 sequences up to 32 steps

2 sequences up to 64 steps

1 sequence up to 128 steps

The gate positions are activated by pushing the associated button. The LED lights up. Pushing the button again deactivates the respective gate position.

More than one reset position per row can be set. The active reset buttons are displayed by means of blinking LEDs. By reaching the first blinking position a reset to step 1 is actuated (and triggers a gate, if position 1 is active/LED on).

To set/remove a reset position push and hold the „Set Reset Pos“ button - then push as many buttons as desired and release „Set Reset Pos“.

Pushing and holding „Set Reset Pos“ and „Reset All“ deactivates all gate and reset positions at once. The gate outputs are „mirrored“ depending



568A

QSTS ASSISTANT

on the chosen „Sequence Mode“. In 2 x 64 mode the gate outputs 1 and 2 respectively 3 and 4 deliver the same output, while the switch-on times of both parallel outputs may be different.

This means: E. g. output 1 with a short gate time provides all active gates, while output 2 with a really long gate time provides only a few „long“ gate signals.

In 1 x 128 mode the four gate outputs provide four times the same signal in parallel. This time with individual gate lengths, as desired, as well.



The **QSTS ASSISTANT MODULE** expand the basic M 568 by more inputs and outputs.

The four left jacks are reset inputs to have the four sequencer rows of the 568 be reset independently from external sources.

The central eight jacks provide trigger outputs, which can be assigned to selectable positions – two on each row of the 568.

The rotary switches on the right side of the module allow to change the running direction of the four rows independently: forward, backwards, ping-pong and random order.

567

UNIVERSAL PROGRAMMER

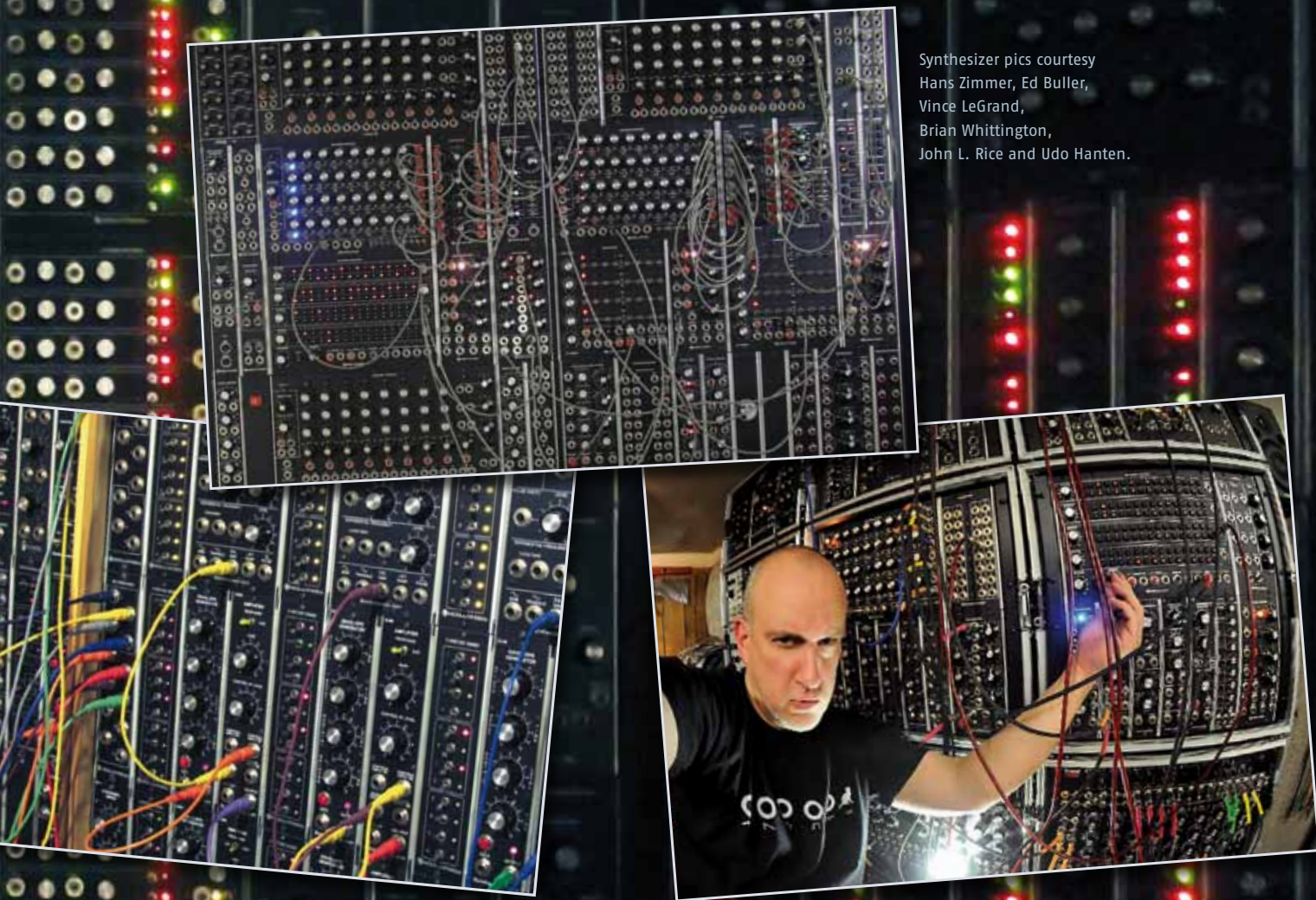
The **UNIVERSAL PROGRAMMER MODULE** enables the user to save and recall settings from the 568 sequencer, 565D quantizer controller and future modules. The 567 can save 2 x 8 settings in its non volatile memory. Operation is simple. Via the push buttons the user selects one of 8 memory slots. Two memory banks are selected via the bank buttons. Four push buttons control the memory operations.

With the lower “go to” buttons/jacks one can step through memory positions in either direction, even by trigger pulses from external sources (or from a 568 itself). This way extremely long trigger sequences could be made possible.





Synthesizer pics courtesy
Hans Zimmer, Ed Buller,
Vince LeGrand,
Brian Whittington,
John L. Rice and Udo Hanten.



QUAD SEQUENTIAL VOLTAGE SOURCE

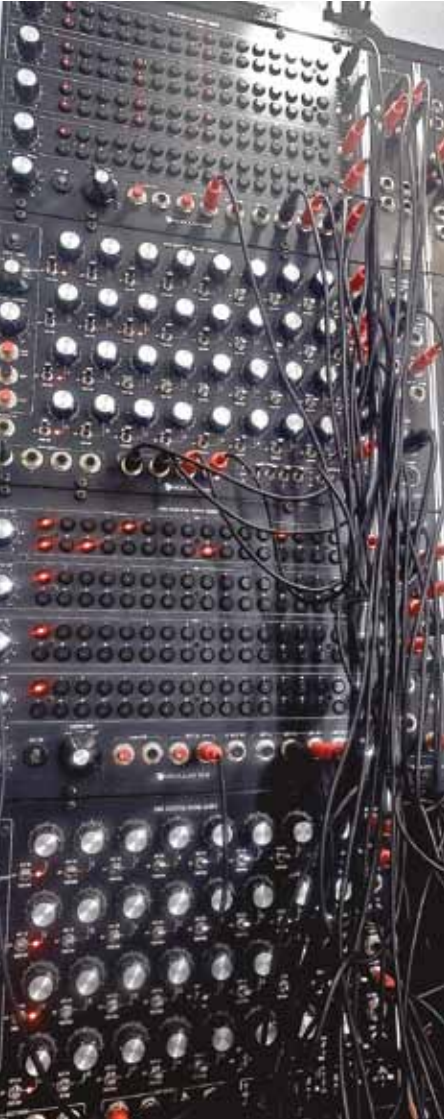


QUAD SEQUENTIAL VOLTAGE SOURCE is an analog step-sequencer with up to 32 positions, arranged in four rows. Each row can be controlled absolutely independent from each other, so that the user has practically up to four separate sequencers at his disposal, each with its own clock- and reset-input jacks, and – at the same time – different running directions (up, down, random and “ping-pong”). In addition the control voltage outputs can be switched between three ranges (2 V, 5 V and 10 V), with the 2 V and 5 V ranges supplying a (1/12 V) quantized output voltage.

Each step position has its own "step-mode"-switch to toggle the gate signal of the respective step position on or off.

In the "Function" position it (again separately for the four rows) can be defined as skip, reset or stop-command.

The module is six units wide.



569ES 569EG

GATE OUTPUT EXPANDER

SET INPUT EXPANDER



The **M 569 EG** and **M 569 ES EXPANDERS** are companion modules to the M 569 Quad Sequential Voltage Source.

The M 569 EG expands the M 569 by 32 individual gate outputs and allows direct access to every single step position.

The M 569 ES expands the M 569 by 32 individual set inputs and allows the direct positioning to each step.

592

SIX CHANNEL REVERSIBLE MODULATION MATRIX

**REVERSIBLE MODULATION MATRIX**

combines six attenuator-units, consisting of three elements each:

- 12 position input selector to choose one of 12 signal inputs
- reversible attenuator, which attenuates or amplifies the input signal in a range from -200 % to +200 %; in zero-position the signal is suppressed completely
- 12 position output selector to choose one of 12 signal outputs

The complete modulation matrix consists of three (or in one special case two, see below) modules – the central active control unit M 592 and the sub-modules M 592i/592o with 12 in- and 12 output-jacks.

The inputs are connected via switching jacks: one single modulation source

can – without any extra patchcord – routed to several different outputs at once, via independent attenuators. By removing a couple of jumpers on the back of the input module these connections can be interrupted.

If more than one input signal is routed to one output, these voltages are summed in the output module.

Internal connection of in/outputs could be made possible.



Is a cabinet in the original Moog form factor (e. g. IIIp) at one's disposal, this in/out-module of the size of a "CP"-panel (2U width) is available.

525

QUAD REVERSIBLE ATTENUATOR



QUAD REVERSIBLE ATTENUATOR module features four active bipolar attenuators for audio signals and control voltages.

„0“-position = no output signal present

„+10“ position = output signal equals input signal (unity gain)

„-10“ Position = output signal equals input signal (unity gain), but inverted

The four input jacks are “chained”, input 1 is internally connected to +10 volts if nothing is patched. So the module doubles as single to quad variable voltage source.

REVERSIBLE MIXER is an active bipolar three channel mixer for audio signals and control voltages with master level control and both inverting and non inverting outputs. In addition each channel has a dedicated on/off ('mute') switch with its own status LED.

„0“-position = no output signal present

„+10“ position = output signal equals input signal (unity gain)

„-10“ Position = output signal equals input signal (unity gain), but inverted.

526

THREE CHANNEL REVERSIBLE MIXER



QUAD SWITCH MATRIX ROUTER

is a passive module, where 2 x 4 output jacks (“destinations”) can be routed in pairs to 2 x 4 signal inputs (“sources”) using four 6-way rotary switches with two “off”-positions.

This simple device is intended as a companion module to the M552, but suitable for a multitude of applications, where audio- and control-signals have to be routed fast and with immediate visual feedback.

Use your imagination.

591

QUAD SWITCH MATRIX ROUTER



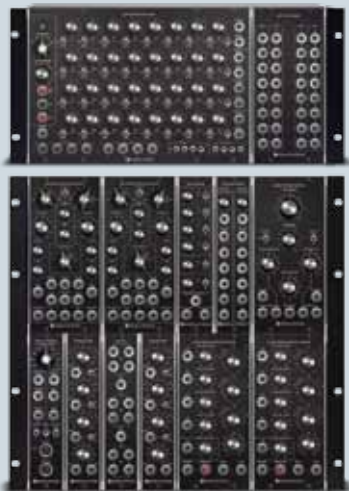
594 M500

MULTIPLES

CASES & ACCESSORIES



MULTIPLE MODULE with 3 x 4 sets of jacks. By using the two additional 'break'-jacks, one can use this module as one, two or three independent four-jack-multiple areas.



POWERED 19" RACK CASES M500-R1M (one row, accommodating 8 module widths) and M500-R2M (two rows for 16 units). Both with power supply ($\pm 15\text{ V}/+5\text{ V}$), connectors for synthesizers.com and COTK, with cabling.



POWERED WOOD CASE M500-C10 (one row, accommodating 10 module widths) with power supply ($\pm 15\text{ V}/+5\text{ V}$), connectors for synthesizers.com and cabling. The case is a handsome blend of birch wood and walnut.



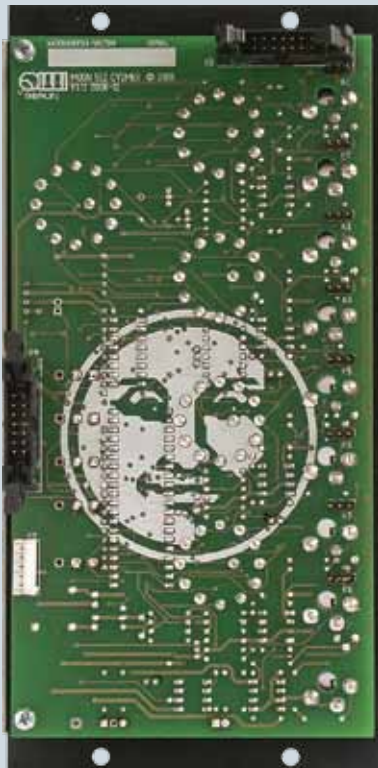
POWERED DESKTOP CASE M500-T6 (one row, accommodating 6 module widths) with power supply ($\pm 15\text{ V}/+5\text{ V}$), connectors for synthesizers.com and cabling. Wooden side panels are included.



BLANK FACEPLATES with or without the 'Moon' logo, in one or two unit widths.

500SERIES

TECHNICAL OVERVIEW



The **500-SERIES** module format follows the 5U industry standard known from other manufacturers (e. g. synthesizers.com/Moog/ Curetronic/Mos-Lab etc.).

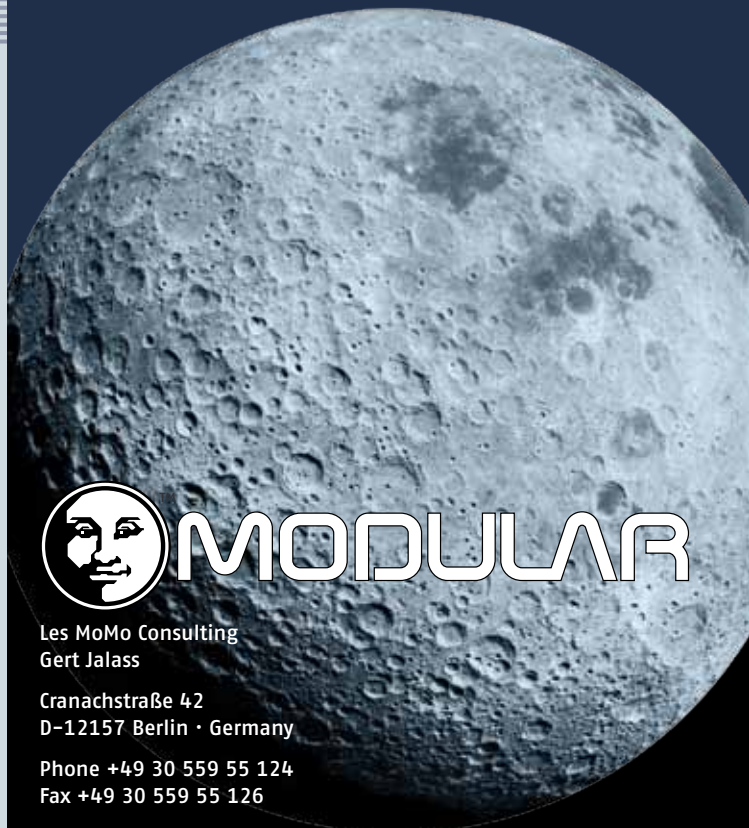
Our modules work with supply voltages of -15 volts/+15 volts. They can be adapted to Moog standard (-6 volts/+ 12 volts) or -12 volts/+ 12 volts as custom order - please ask us.

Two power connectors (synthesizers.com/Club of the Knobs) are on-board as standard, adaptors for other systems are available upon request.

Threshold voltage of the trigger inputs is +1 volt. Control voltage range is usually 10 volts.

The faceplates are etched as the original Moog modules.

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MODULAR

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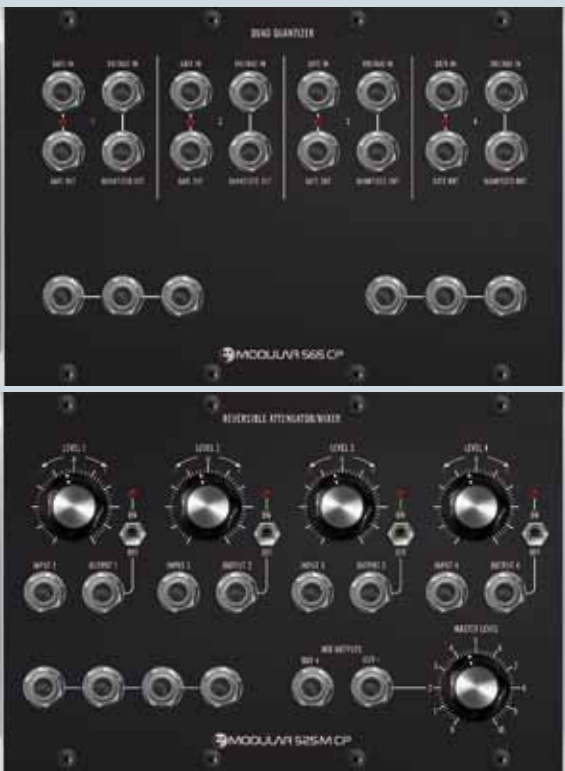
The "Moon" logo is a registered trademark of
Les MoMo Consulting, Berlin, Germany

CP SERIES

QUAD QUANTIZER · FOUR CHANNEL ATTENUATOR/MIXER · TRUNK LINES MODULE

Due to customers' request we now include some of our modules in the vintage "Console Panel" format known from the bottom row modules in the classic "P"-case and "C"-type synthesizer cabinets.

Note: These modules are only available directly from the Berlin factory and are manufactured on special order.



The **M 525M ATTENUATOR/MIXER** combines the functionality of the 525 Reversible Attenuator und the 526 Reversible Mixer: Four input channels with mute switches and LEDs, doubling as separate attenuators. Master outputs with inverting and non-inverting output jacks and master level knob.

The **M565 CP QUAD QUANTIZER** features four independent quantizer circuits as its sister module M 565 (page 7).

The **M590 TL** is a "trunk line" module that offers 24 entry/exit points to/from our 19" 2U back plane(s). They are used to provide the connectivity between multiple cabinets (using multicore cables with EDAC connectors).



CP SERIES

SEQUENTIAL DIVIDER SWITCH · MULTIPLE MODULE · SET INPUT/GATE OUTPUT EXPANDERS



The M 564CP **SEQUENTIAL DIVIDER SWITCH**, behind a CP-type panel. This combination of a sequential 4-to-1/1-to-4 bi-directional electronic switch with clock divider has the same functionality as the standard M 564 module (see page 9).

MULTIPLE MODULE with 4 x 4 sets of jacks. By using the three additional 'break'-jacks, one can use this module as one, two, three or four independent four-jack-multiple areas.



The **M 569 EG** and **M 569 ES EXPANDERS** as companion modules to the M 569 Quad Sequential Voltage Source.

The M 569 EG expands the M 569 by 32 individual gate outputs and allows direct access to every single step position.

The M 569 ES expands the M 569 by 32 individual set inputs and allows the direct positioning to each step.



CUSTOM SERIES

Over the years several customers asked us to design modules following their special specifications or applications. In part these modules found their way into our standard production line of modules while others – examples shown here – are on special request.

In general the idea behind the modules shown on this page is to use a modular synthesizer in its basic functions on stage or in the studio without creating a complex jungle of patch cords – achieving a faster workflow without losing track of the given patch of the synthesizer.

The example shown below is the modular system from Ed Buller (Node).



The **M590 VI** allows to distribute 12 control voltages to M 590 V modules.

These modules contain precision summers and their output can be wired to e.g. an oscillator or filter CV input.

The bus can be part of our standard 19" 2U back plane interconnect.



The **M590 TL** is a "trunk line" module that offers 18 entry/exit points to/from our 19" 2U back plane(s). They are used to provide the connectivity between multiple cabinets (using multicore cables with EDAC connectors).



The **M590 OM** allows to attenuate and sum the outputs of a 921a/c oscillator bank.

The **M590 OM CP** is providing twice the sum of each (of 5) M590 OM. Each one can be attenuated and is available both normal and inverted.



The **M590 GI** allows to distribute 12 gate/trigger signals to M590 G modules. These modules combine (logical or) and their output can be wired to e.g. an envelope generator input. The output is available as gate and Moog S-Trigger. The bus can be part of our standard 19" 2U back plane interconnect.



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